
Opportunities and Challenges for Specialty Crops: Will They Sell If Developed?

Q&A

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Andrea Fonseca (Texas A&M University, College Station): You said that multinationals won't work. Can you elaborate on that?

Roger Beachy: My point is that the multinational companies, who are the most successful in the science and technology and in product development in GM agriculture, are heavily criticized for the appearance that they are "taking over the world's germplasm and will control farmers." So, while what the report about the safety of GM foods has been scientifically validated, the multinationals are tainted in the eyes of some consumers. My colleague at Washington University, Professor Garland Allen, a historian of science said, "Roger I have a plan to make food available for free for everybody in the world." While some may feel that government should take on this role, others of us believe that the private sector plays an important role in food and agriculture.

Fonseca: Okay, I see what you mean.

Beachy: And he's not alone. That was my context.

Fonseca: You mentioned EPA barriers. What, in your opinion, is the most significant barrier at the EPA?

Beachy: The interpretation of definitions. For example, virus resistance was referred to as a pesticide because it controls a pest. In contrast, conventional disease-resistant traits are not called pesticidal. Describing a transgenic trait as such implies that DNA, or in some case RNA, is being classified as a pesticide. Another one that concerns me is that

genes used to affect climate resilience—drought tolerance and so forth—are classified broadly by one agency as growth regulators. The definition of a growth regulator in that context seems ridiculous. A learning should go on and the learning is called biology. It's called genetics. It's called plant physiology. It's called pathology. It's called information that we appreciate as science, and the consensus that results is what we know as scientific validation. Those are some of my concerns about the EPA. The need for regulation of GM crops of this type is something that I don't understand.

Nikhil Patil (Texas A&M AgrLife Research, College Station): You did a great job in presenting the whole perspective on local food security. We all know that we cannot achieve global food security without GMOs. In the early years, Europeans failed, in my opinion, to provide good education about GMOs. In the United States we are doing a little bit better in terms of educating people. Do you think we can improve global food security by inclusion of GMOs?

Beachy: We have a long way to go. We have yet to see Golden Rice in the market; it has been delayed for nearly 15 years. GM technologies are not yet considered part of the nutrition solution. We haven't yet seen *Bt* brinjal⁵ in the Philippines, Bangladesh, or India. In the early days, China released some GM peppers, cucumbers and tomatoes that were virus resistant. So we know it is possible to move products of public sector research to the marketplace. There are ongoing field trials in Uganda with a bacterium-resistant banana, and I think that there are disease-resistant banana, cassava and sweet potato in trials. And there is GM cowpea with resistance to bruchid beetles. It may well be that the advantage for use of GM-horticulture crops will occur more effectively in less economically advantaged countries than in ours. It doesn't sound very good for a specialty crops meeting like this one, but that may well be the way it will happen. Perhaps we need to think in terms of importing sweet-potato fries from Uganda made from GM plants.

Bob Avant (Texas A&M AgriLife Research, College Station): Recently USDA announced they were going to go through an EIS⁶ process for deregulation of GMOs using the NIFA⁷ process. Typically, environmental activists use that as a way to delay or kill projects. Do you think that doing EISs on GMOs will have a chilling effect on getting additional traits deregulated?

Beachy: I don't think it will if we do it right. We ought to take our medicine if that's the way it's going to go before the law is changed, if ever; perhaps we could include EIS-related studies with every field trial. Create the portfolio and just get it done. Of course, this requires that the EPA and USDA define adequately what an acceptable EIS is. We should learn the steps and collect the necessary data up front. That way, it won't cost the developer additional years and another few million dollars. Just do it.

⁵Eggplant/aubergine.

⁶Environmental impact statement.

⁷USDA's National Institute of Food and Agriculture.

Bill McCutchen (Texas A&M AgriLife Research, College Station): You've been through the genesis of this. What do you see as the path of least resistance for public institutions—land-grant universities—to actually get our transgenic specialty crops deregulated? You pointed out some facts, but why can't we come together and get it done?

Beachy: I don't know. Why can't you?

McCutchen: I don't know. That's why you're the keynote speaker.

Beachy: Something occurred recently that shocked me. At an annual meeting of the American Phytopathological Society, I gave a forward-looking speech and a number of students who gathered around afterward said they had been told by their professors not to consider GM approaches. We have to start in our universities by saying that GM technologies are part of plant breeding. Everybody in science should know about genetics and plant breeding, including genetic engineering, and their role in agriculture sustainability, food safety, nutrition, and so on. We've got to start with education. The other approach may well be to begin talking about our current crop-genetic-engineering research projects in a transparent way, so that when the results are in we can say, "This is what your investment has brought us." In the world of cancer research, they talk about solutions for many years before they accomplish them, which in a way justifies the continuing investments in cancer research, and why there is a cancer center at a hospital or in a university setting near you. In agriculture we are reluctant to describe our goals or that we might be using advanced genetics to achieve them. Perhaps there's a marketing point here that universities should pursue. Maybe it should be led by the APLU⁸. Maybe it should be led by science societies, by the groups of plant producers or plant breeders who come forward to say that this is a key part of the technology that will achieve drought tolerance or insect resistance or lower-glycemic-index rice that tastes like its high-glycemic-index counterpart. Whatever the goal, we should indicate it now and that we expect achievement in 5 to 10 years. Maybe we should be more aggressive in our research reports and describe what we in agriculture are working toward. We have a scientific capacity here that is compelling and we have too long been in the closet on so many of these important issues. Sometimes we are our own worst enemies; for the first 15 years of crop genetic engineering, many public plant breeders were saying that GM would not be a useful to agriculture. We have a lot to do in our own universities. At most university campuses on which I speak, there are students of agriculture, among others, who have reached the conclusion that GM crops and foods are not good for the environment and not good for health. They have either not been taught the facts, or the available information has not been taught correctly. If we can't get it right in our own schools of agriculture, how can we expect the mom with three kids to think that GM foods are okay? This is not something that I thought about just last night, but something that has been happening for a number of years. It will be interesting to see if Dennis Gonsalves⁹ feels the same way.

⁸Association of Public and Land-Grant Universities.

⁹Pages 37–46.

We have really failed in our schools of agriculture and colleges of arts. People at the little college I went to in Indiana thought that Vandana Shiva walks on water. When I gave a lecture there, some were sure that I was a devil from Monsanto. It's an amazing thing. Anti-science people, or at least those who are anti-modern agriculture, are from a small percentage of the population who demand policies based upon their voices. Perhaps we in the field did not do our jobs in the early years; so what should we do now, 20 years later? I'm not sure, and that's why I ask rhetorically, "Why can't you get it done?" I don't know if we have yet formulated a good suggestion of what to do to counter the mistruths that are being promulgated about GM foods.

Chris Dzuik (H-E-B, San Antonio): I work for a retailer and we try to be transparent with our customers. With the pink-slime issue, the social media took over and a product that was acceptable is now gone. With new technologies such as irradiation, we can refute what some of the activist groups are saying through research. How can I, as an employee of this company, contradict what we see on social media, such as posters saying that GM creates autistic children, allergens, and so on. Where would I go to find good data?

Beachy: I don't think it's at a single location or website; nor is the information being used in way that is reaching those who want useful information. Of the population who are against GM foods, I would venture to guess that many are also against childhood vaccines. An article by Marcel Kuntz in the October 2012 issue of *EMBO Reports*, asked the question, "In the postmodern assault on science: If all truths are equal, who cares what science has to say?" If religious truth or philosophical truth or the truth from a blog is equal to the truth of science, and policymakers consider them to be equivalent, then how do we expect to move forward? I suspect that many who are attending this meeting can agree that we have a science-literacy problem; we as scientists also have a believability problem, and for some there is a trust problem.

Bolormaa Jamiyansuren (University of Minnesota, Minneapolis): I do research on international trade of GMO products. How do you see the future for North American GMO producers, especially given that the competition is unfair. For example, the European Union had a strict labeling law that provided ample time for them to catch up with American producers, and now the law isn't so strictly enforced.

Beachy: I don't have a clear answer or a prediction about trade of GMO products. I happen to know a little bit about the China situation. A year or so ago, China said that they would not allow the growing of GM soybeans or corn, which some interpreted as a delaying tactic so that China could build its local industry before permitting cropping using foreign seeds. Meanwhile there has been a great deal of investment in agriculture and food-related science and biotechnology, and seed companies in China will soon market their own advanced seed varieties, and multinational seed companies may then be allowed to compete. With the use of non-tariff trade barriers such as this, I don't know if we can expect any legislative or judicial body to exact changes. And, Europe probably will go at its